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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/620,346

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Hiroshi Sumi

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EXAMINER

LAM, CATHY FONG FONG

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/620,346	Applicant(s) SUMI ET AL.	
	Examiner Cathy Lam	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-10 and 15-22 is/are pending in the application.
- 4a) Of the above claim(s) 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-10 and 16-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11-19-2008 & 5-21-2009</u> . | 6) <input type="checkbox"/> Other: _____ |

In view of the amendment and remarks filed on Feb. 10, 2009, the 112 rejections have been withdrawn. The pending claims however continue to be unpatentable as following:

Election/Restrictions

1. This application contains claim 15 is drawn to an invention nonelected with traverse. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 112

2. Claims 16-18, 21 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 16-18 are redundant and not further limiting the base claims. Clarification is required.

In claim 21 and 22, the phrase "wherein the SiO₂ particle constituting the copper paste a hydrophilic surface" is vague and indefinite, as it is unclear what "hydrophilic surface" is applicant referring to? Since it is a copper paste that is being claimed.

Claim Rejections - 35 USC § 102/103

3. Claims 1, 2, 4-10 and 16-22 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kang et al (US 5296189).

It is noted by the Examiner that some claims 21 and 22 are drafted in a product by process format. It is the product itself which must be new and unobvious. Unless some unexpected result is shown that occurs due to Applicant's specific process(es), different processing steps are not patentably distinguishing for claims to an article.

Kang discloses a conductive composition comprised of copper particles and alumina particles. The conductive composition is formed into a conductive paste which can be screen-printed onto a ceramic substrate to form a printed circuit board. The conductive paste may be filled into via holes of the ceramic substrate or printed onto the surface of the ceramic substrate (col 6 L 40-43 & L 54-56).

The conductive composition that comprised of copper particles having initial particles size of 2 to 5 μm and the alumina particles of 0.05 to 0.1 μm (or 50-100 nm) in average (col 5 L 43-45 & L 68-col 6 L 1). Kang further teaches that other inorganic materials such as titania (or TiO_2) and silica (or SiO_2) are feasible and have the same function as alumina (Al_2O_3) particles (col 4 L 34-35). The amount of alumina particles is 0.5 to 2 wt% (col 4 L 40-41).

The conductive composition further comprised of an organic vehicle and/or binder (col 9 L 39-40).

The prior art is silent about the resistivity of the conductive layer (as in claim 4), the examiner is taking the position that since Kang's conductive paste meets the claimed composition, Kang's copper paste inherently possesses the same resistivity.

The examiner is taking the position that Kang teaches claims 6, 8-9, 16-20 since average size of the alumina particles is 0.05 μm (or 50 nm), i.e. < 2 μm . Kang further

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teaches that such small size alumina particles are for a more homogeneous mixture with the copper power and to reduce inter-particle porosities (col 6 L 1-12). The resolution in an optical microscope was not possible (col 6 L 1-2). This implies that the inorganic particles are evenly dispersed with the copper particles and formed a homogeneous conductive layer (col 4 L 57-61).

Regarding to claim 7, Kang teaches a multilayer printed circuit board, and the conductive paste that is formed in the via holes and between the ceramic substrates, the examiner is taking the position that the conductive paste is subjected to a plating treatment (col 6 L 51-56).

Kang teaches Al_2O_3 and TiO_2 , etc. as ceramic particles and silica (i.e. SiO_2) as the glass particles, in column 4 lines 30-35, it clearly shows that TiO_2 and SiO_2 have the same function as Al_2O_3 , thus it could be interchangeably used, and choosing two of more of these sintering retardant materials is conventional in the art.

Regarding to the limitation of the SiO_2 being 30 nm or less in the independent claims, the specification clearly states that the workable SiO_2 size can be 50 nm or less, there would be no detrimental effect as long as the particle size is no greater than 50 nm (page 7 L 18-22). However in claims 8-9 & 19-20, Applicant's invention may include existence of inorganic particles, *not the copper powder*, having sizes that are 2 μm or 3 μm (i.e. 2000 nm or 3000 nm). Applicant in the independent claims limits the inorganic particles to 30 nm or less for SiO_2 and 100 nm or less for ceramic particles, but the dependent claims allow some *much* larger size inorganic particles. Since the depending claims allow existence of larger size particles, the examiner is taking the

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position that having a slight larger SiO_2 or Al_2O_3 , that is 50-100 nm as taught by the prior art, would have no detrimental effect.

Regarding to claim 5, Kang discloses the ceramic substrate that is formed of crystallizable glass particles that are densified to from a green sheet (col 7 L 8-13).

The crystallizable glass particles can include lithium disilicate and/or eucryptite, both of which containing lithium and in the form of an alkali metal oxide (col 9 L 3-20).

Kang is silent about the mol% of the alkali metal oxide in the green sheet. In view of Kang's teaching, one skill in the art would choose a workable amount because it only involves routine experimentation.

Response to Arguments

4. Applicant's remarks and the Declaration under 37 CFR 1.132 filed February 10, 2009 have been fully considered but they are not persuasive. The above prior art rejection concisely explained the examiner's position.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cathy Lam/
Primary Examiner, Art Unit 1794